A STUDY TO DETERMINE THE FREQUENCY OF OCULAR MANIFESTATIONS IN HIV/AIDS PATIENTS

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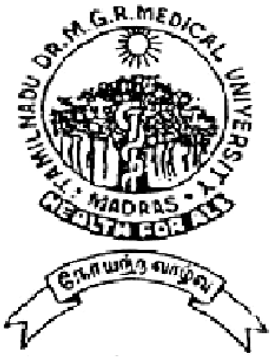

THE TAMILNADU

DR.M.G.R. MEDICAL UNIVERSITY

CHENNAI, TAMILNADU

CERTIFICATE

This is to certify that this dissertation entitled **"A STUDY TO DETERMINE THE FREQUENCY OF OCULAR MANIFESTATIONS IN HIV/AIDS PATIENTS"** is the bonafide original work of **Dr.VENI PRIYA.S.,** in partial fulfillment of the requirement for M.S., (Branch III) Ophthalmology examination of the Tamil Nadu Dr.MGR Medical University to be held in March 2010.

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DECLARATION

I, **Dr.VENI PRIYA.S.,** solemnly declare that this dissertation **"A STUDY TO DETERMINE THE FREQUENCY OF OCULAR MANIFESTATIONS IN HIV/AIDS PATIENTS "** is a bonafide record of work done by me in the Department of Ophthalmology, Madurai Medical College, Madurai under the guidance of **Dr.A. SULAIMAAN, M.S.,D.O.,** Head of the Department, Department of Ophthalmology, Madurai Medical College, Madurai.

This dissertation is submitted to the Tamilnadu Dr.M.G.R.Medical University, Chennai in partial fulfillment of the University regulations for the award of M.S Degree (Ophthalmology) Branch-III, Examination to be held in March 2010.

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CONTENTS

INTRODUCTION

AIDS is a potentially fatal multisystem disease characterized by Profound disruption of the Immune system & a tendency for various opportunistic infections & neoplasms.

AIDS was first recognized in United States of America in the summer of 1981. Since then it has emerged as a global pandemic health problem of extra ordinary proportions & unprecendented emergency.

At the end of 2007, 33.2 million people were living with HIV as per Joint United Nations Programme on HIV/AIDS. There are nearly 5.7 million people infected with HIV in India.

Ocular manifestations are seen in 40 – 70 % of HIV patients. It can be caused by opportunistic infections, immunological reactions, neoplasms & by HIV infection per se. It can affect almost all the structures of the eye.

Life time cumulative risk of atleast one abnormal ocular lesion developing in HIV patient ranges from 52 – 100 % in various studies. Some of these manifestations are potentially vision threatening.

CD4 lymphocyte cells are proved to be a reliable predictor of ocular manifestations of HIV infection. Ocular lesions are usually seen in the end stages of the disease when the immunity is the lowest (low CD4 count). With the introduction of HAART in 1990s, the incidence of ocular manifestations has come down.

Many a times ocular lesions may be the first clinical presentation & can help the clinician to suspect the underlying HIV infection.

Ocular lesions can be categorized by the ocular structures involved as below

- Anterior segment manifestations – seen in upto 50% of HIV patients
- Posterior segment manifestations – the most common & the most severe vision threatening manifestations seen in > 50% of HIV infected patients. HIV microangiopathy is the most common lesion followed by CMV retinitis.
- Ocular adnexal manifestations.
- Neuro ophthalmic manifestations – seen in 10 – 15 % of HIV infected patients.
- Orbital lesions.

Early recognition of ocular lesions will help early institution of therapy & there by preventing visual loss. This is of even greater significance nowadays, following the introduction of HAART & with increased life expectancy of AIDS patients.

HUMAN IMMUNODEFICIENCY VIRUS

HIV is a RNA virus belonging to human Retro virus, Lentivirus subfamily. It has a unique reverse transcriptase enzyme. HIV 1 & HIV 2 are currently known to infect human beings. In India, HIV Type 1c is the commonest type reported, though both types exist.

MORPHOLOGY OF VIRUS:

Virus is 120 nm in diameter consisting of an outer envelope, a core shell of protein & a cone shaped inner core containing RNA genome, reverse transcriptase enzyme & core polypeptides.

There are 3 structural genes

1. 'gag' gene (group antigen)
2. 'pol' gene (polymerase)
3. 'env' gene (envelope antigen)

Apart from these genes, the virus also contains additional regulatory genes like tat, rev, ref, vif, vpr & vpu.

STAGES OF VIRAL REPLICATION:

- HIV glycoprotein 120 attaches to the CD 4 receptors on CD4 cells , activated monocytes & macrophages & glial cells ; virus enter these cells

- RNA genome of HIV is converted to DNA by reverse transcriptase enzyme.
- Viral DNA then enters the host nucleus & gets incorporated into the host cell DNA with the help of endonuclease.
- Virus components are produced by the host cell. Mature viruses burst out of the host cell, lysing them, to infect new cells Viral turn over is very high upto 10^9 particles every 1.5 – 2 days.

ROUTES OF TRANSMISSION:

The major routes of transmission are sexual contact, parenteral exposure to blood & blood products & vertical transmission.

WHO CLINICAL STAGING OF HIV/AIDS FOR ADULTS & ADOLSCENTS, 2006.

CLINICAL STAGE 1:

- Asymptomatic
- Persistent generalized lymphadenopathy

CLINICAL STAGE 2:

- Unexplained weight loss
- Recurrent respiratory tract infections

- Herpes zoster
- Minor mucocutaneous manifestations

CLINICAL STAGE 3:

- Unexplained severe weight loss
- Chronic diarrhea > 1 month duration
- Persistent fever > 1 month duration
- Oral candidiasis
- Oral hairy leukoplakia
- Pulmonary tuberculosis
- Severe bacterial infections
- Unexplained anemia

CLINICAL STAGE 4:

- HIV wasting syndrome
- Pneumocystis pneumonia
- Esophageal candidiasis
- **Cytomegalovirus infection**
- CNS toxoplasmosis
- HIV encephalopathy
- Extra pulmonary tuberculosis

- Kaposi sarcoma
- Lymphoma

CDC REVISED CLASSIFICATION OF HIV DISEASE – 1993

Absolute CD4 count cells/cu mm	A Asymptomatic/ PGL/ acute seroconversion illness	B HIV related conditions not included in A or C	C Clinical conditions listed in AIDS surveillance case definition
>500	A1	B1	C1
>200 – 499	A2	B2	C2
<200	A3	B3	C3

OCULAR MANIFESTATIONS OF HIV

Ocular involvement in AIDS is very common & includes various clinical presentations.

The first report of the ocular manifestation in AIDS was done by Holland et al in 1982. In India, it was reported by J.Biswas et al in 1995.

In general CD4 count has been used to predict the onset of certain ocular infections in HIV patients.

CD4 COUNT cells/ cu mm	OCULAR MANIFESTATIONS
<500	Kaposi sarcoma,lymphoma, TB
<250	Pneumocystis, toxoplasmosis
<100	Retinal/conjuctival microvasculopathy, VZ retinitis, CMV retinitis, MAC infections, cryptococcosis, microsporidiosis, HIV encephalopathy, progressive multifocal leukoencephalopathy

OCULAR ADNEXAL MANIFESTATIONS

Adnexal manifestations are seen in 25% of HIV patients & it can be a sign of severe immunosuppression. It includes

Herpes zoster ophthalmicus

Conjunctival microvasculopathy

Conjunctival OSSN

Kaposi sarcoma

HERPES ZOSTER OPHTHALMICUS:

It is a painful vesiculo bullous dermatitis resulting from the reactivation of the latent varicella zoster virus in the ophthalmic division of the trigeminal nerve.

It is seen in 5-15% of HIV patients. Any patient younger than 50 years of age presenting with HZO should be suspected to have underlying immunosuppression like HIV.

In HIV patients, HZO have prolonged & severe course with a higher rate of painful sight threatening complications & increased incidence of post herpetic neuralgia. It may also occur bilaterally & without associated skin lesions.

HZO is associated with conjunctivitis, keratitis, scleritis, blepharitis, uveitis, retinitis , encephalitis, hemorrhagic hypopyon.

Tissue damage is mediated through occlusive vasculitis.

The relative risk of HZO in HIV patients is 6.6: 1.

TREATMENT:

INDUCTION DOSE:

I.V. Acyclovir 10mg/kg body weight TID – 7 days

MAINTENANCE DOSE:

oral acyclovir 800mg 5 times a day for atleast 3-5 weeks.

Other drugs : famciclovir, I.V. foscarnet

LID INFECTIONS

Often severe & recurrent blepharitis, stye & lid ulceration can occur.

TREATMENT: lid hygiene, antibiotics

MOLLUSCUM CONTAGIOSUM

Highly contagious infection caused by DNA pox virus.

The eyelid is involved in 5% o HIV infected patients. In these patients, they are multiple, rapidly growing, bilateral, confluent & more prone for secondary infections. They tend to recur after removal.

The virus particles may release into tears & cause toxic keratoconjunctivitis.

TREATMENT:

Cryotherapy with podophyllotoxin cream as an adjunct & excision.

CONJUNCTIVAL MICROVASCULOPATHY

An asymptomatic vascular changes including segmental vascular dilatation & narrowing, microaneurysm, comma shaped vascular fragments & sludging of blood columns.

It is seen in 70 – 80% of HIV patients.

Specific etiology is not known. However increased plasma viscosity & immune complex deposition related to HIV or the direct infection of HIV in the endothelium may be the cause.

No treatment required.

CONJUNCTIVAL OSSN

It is usually seen in old age > 70 years and rarely seen in normal persons.

In HIV patients, the risk of developing OSSN increases by 10-13 fold & occurs in young age. It constitutes the third most common neoplasm associated with HIV. It bears no correlation with CD4 count.

Hypothesis proposed for etiology:

1. generalized depression of immune surveillance with severe immunosuppression
2. coinfection with HPV 16 & 18.

Usually presents as pink papillomatous mass with feeder vessels in the limbus.

TREATMENT:

Local excision with 2-3 mm safety margin & underlying scleral resection

Adjunctive: cryotherapy to the conjunctival margins, brachytherapy, topical chemotherapy (mitimycin c, 5 – fluorouracil, IFN α 2B)

Enucleation , exenteration can be done if the tumour is advanced.

KAPOSI SARCOMA

It is a highly vascularised, painless mesenchymal tumour that affect skin & mucous membrane. Propable etiology may be due to infection of human herpes virus – 8.

Conjunctival KS is seen in 10 – 20% in HIV patients . But in India it is very rare, because of low incidence of HHV – 8.

TREATMENT : radiation therapy

Excision with intralesional vinblastine.

ANTERIOR SEGMENT MANIFESTATIONS:

>50% of HIV patients have anterior segment manifestations.

It includes

1. Keratitis
2. Keratoconjunctivitis sicca
3. Iridocyclitis

KERATOCONJUNCTIVITIS SICCA:

Results from deficiency of any tear film layer; usually seen in the late stage.

It is seen in 10 -20 % of HIV infected patients. Etiology is related to HIV mediated inflammation & damage to the accessory glands & to the direct effect of HIV virus itself on conjunctiva.

TREATMENT:

Lubricants & eye ointments

KERATITIS:

VIRAL:

Herpes is the most common cause of infectious keratitis. In HIV patients, they tend to have a longer, more severe course. They recur more often & resistant to treatment.

HSV – predilection for peripheral cornea & may cause painful corneal ulceration. In HIV patients, since the T cell immunity is low,

HSV stromal disease occur infrequently. HZV – usually associated with HZO iritis & increase in IOP may occur.

TREATMENT: Topical & systemic antiviral agents.

BACTERIAL:

Frequency not increased but generally more severe in HIV patients. It may occur bilaterally, involve multiple pathogens & carry a higher risk of perforation.

Ocular flora in HIV patients is not different from that of general population, but the risk of infection with the normal flora is high in severely immuno suppressed individuals.

MICROSPORIDIA:

Cause multiple diffuse punctuate epithelial keratopathy & follicular conjunctivitis. Massom trichrome or giemsa stain can be used for diagnosis.

TREATMENT: topical fumagilin, oral albendazole, oral itraconazole.

IRIDOCYCLITIS

It is rarely associated with HIV disease. It is usually associated with retinal or choroidal infection with opportunistic infections such as CMV, HSV, HZV, TB , etc.

Rifabutin & cidofovir may induce iritis.

Immune recovery uveitis in CMV infected patients on HAART therapy.

POSTERIOR SEGMENT MANIFESTATIONS

Seen in more than 50% of HIV infected patients.

It includes

1. non infectious – HIV microangiopathy &
2. infectious

These lesions can potentially affect the vision, if not treated early.

HIV MICROANGIOPATHY:

The most common ocular lesion seen in 50-70% of HIV infected patients. The lesion includes cotton wool spots, hemorrhages & microaneurysm, which are generally asymptomatic & transient. BRVO, BRAO & ischemic maculopathy may occur.

Etiology may be due to

Increased plasma viscosity & fibrinogen levels

Circulating immune complexes

Infectious damage to the endothelium

No treatment required. HAART decreases the prevalence of microangiopathy.

CMV RETINITIS:

The most common opportunistic intra ocular infection in HIV patients seen in 15 – 40% .It occurs when the CD4 count is <100 cells / cu mm.

Clinically present as three forms:

1. perivascular fluffy white lesion with many scattered hemorrhages.
2. more granular lesion with few hemorrhages with central area of atrophic retina.
3. frosted branch angitis – rare

These lesions expand in brush fire pattern. Anterior spill over uveitis may occur with fine stellate KPs.

Complications include retinal detachment & optic nerve involvement.

CMV IN HAART ERA:

After the introduction of HAART,

- the incidence of CMV retinitis has decreased by 75%,
- the risk of vision loss is lower,
- the risk of RD is 60% less & the survival increased by > 1 year.

Patients treated with HAART with sustained CD4 count elevation of >100 cells/cu mm for atleast 3-6 months & with well healed CMV retinitis inactive for 3-4 months can be given a trial of withdrawal of CMV therapy.

IMMUNE RECOVERY UVEITIS:

It is an intra ocular inflammation caused by the reconstituted immune system with HAART therapy in response to the persistence of CMV antigen.

It may present as anterior uveitis, vitritis, papillitis & macular edema. Complications include cataract, CME & epiretinal membrane formation.

TREATMENT : topical & periocular steroids

TREATMENT OF CMV RETINITIS:

ANTI CMV DRUG	INDUCTION	MAINTENANCE	SIDE EFFECTS
Ganciclovir Oral Intravenous intravitreal	Not used 5mg/kgBDx2wks 200-2000 mcg /0.1 ml	1gm TID 5mg/ kg daily Weekly once	Neutropenia, thrombocytopenia, anemia, nephrotoxicity
Valganciclovir oral	900mgX2wks	900mg OD	Same as above
Foscarnet Intravenous intravitreal	60mg TID X 3 wks 2.4 mg /0.1 ml ; twice weekly	90 mg/kg OD Once a week	Nephroyoxicity, electrolyte imbalance
Cidofovir: Intravenous intravitreal	5mg/kg once a wk X 2wks 15 – 20 mcg/0.1 ml	5mg/kg every 2 weeks Once in 6 wks	Proteinuria, hypotony,iritis, neutropenia, peripheral neuropathy
fomiversin	330 mcg; 2 doses for every 2 weeks	2 doses for every month	

GIOD - Ganciclovir Intraocular Device

It is a sustained release drug delivery device that contains about 4.5 – 6mg of ganciclovir. It is surgically placed into the vitreous through the pars plana route.

Investigational drugs: maribavir, tomeglovir

RD in CMV retinitis is characterized by multiple breaks, so vitrectomy with silicon oil injection is the preferred modality of treatment.

TOXOPLASMA RETINOCHOROIDITIS

It accounts for 1% of the AIDS related retinal infections.

The typical ocular presentation is

A focus of retinitis adjacent to a pigmented retinochoroiditic scar.

Vitritis , spill over anterior uveitis, focal retinal vasculitis are associated factors.

TREATMENT:

DRUGS	DOSAGE SCHEDULE	SIDE EFFECTS
pyrimethamine	75mg/day X2 days; 25mg/day X 4 wks	Bone marrow depression, GI intolerance, teratogenic
sulfadiazine	2g orally followed by 1 gm QID X 4 wks	Renal crystallization, skin rash, SJ syndrome

OCULAR SYPHILIS:

It is seen in 1-2 % of HIV patients. In HIV patients, ocular syphilis is often associated with neurosyphilis. The most common presentation is uveitis. Others include retinitis, vasculitis, optic neuritis & papilloedema. Treatment: 12-14 million units /day of IV penicillin G – 14 days.

FUNGAL INFECTIONS:

Candida, Cryptococcus, pneumocystis carinii infection can occur.

NEURO OPHTHALMIC MANIFESTATIONS:

Seen in 10-15% of HIV patients. It may be due to direct effect of HIV or secondary to opportunistic infection of CNS.

Cryptococcal meningitis & intracerebral toxoplasma may cause papilloedema, optic atrophy & cranial nerve palsies. Neurosyphilis, progressive multifocal leukoencephalopathy, CNS lymphoma & intra cerebral infection with herpes may also be related to neuro phthalmic manifestations.

ORBITAL MANIFESTATIONS:

Uncommon in HIV patients. Orbital lymphoma & orbital cellultis due to aspergillus are more common.

REVIEW OF LITERATURE

Kuppermann BD et al (1993) studied the prevalence of CMV retinitis & HIV retinopathy in HIV patients. In his study, CMV retinitis was seen in 20% patients& HIV retinopathy in 35% . In pts with CD4 count < 50cells /cumm, 30% had CMV retinitis & 45% had HIV retinopathy. In patients with CD4 count > 50cells /cu mm, none of the patients had CMV but 16 % had HIV retinopathy.

DA Jabs et al (1995) studied the frequency of ocular complications in HIV patients . He reported CMV retinitis in 37% of HIV patients & HIV retinopathy in 50%. toxoplasma, VZ retinitis, pneumocystis choroidopathy seen in < 1%. HZO was seen in 3% of patients & in all stages of the disease. NO manifestations were seen in 6% of patients secondary to cryptococcal meningitis.

J Biswas et al (1998) reported CMV retinitis in 24% & HIV retinopathy in 19% of cases with ocular manifestations. Optic atrophy & RD were attributed to CMV retinitis. Endogenous endophthalmitis was seen in 6% of cases.

DK sahu et al (1999) evaluated the prevalence of ocular manifestations in a group of 19 patients with HIV from South India. In their report, none of them had conjunctival malignancy & corneal

involvement. All 19 patients had posterior segment involvement primarily. HIV retinopathy was present in 34%, CMV retinitis in 39%, HS related ARN & retinitis in 11%, TB choroiditis in 11%, while HZ retinitis & presumed P.carinii choroidopathy each were observed in 2.5% of eyes.

Macdonald JC et al (2000) studied the effect of immune recovery in HIV patients treated with HAART on CMV retinitis. They have reported that in patients treated with HAART, with sustained elevation of CD4 count & healed inactive CMV retinitis > 4 months are likely to remain healed if anti CMV therapy is withdrawn.

J. Biswas et al (2000) reported that the spectrum of ocular lesions associated with HIV infection in India is different. The prevalence of CMV retinitis & HIV retinopathy is lower in India. They reported CMV retinitis in 17% & HIV retinopathy in 15 %.

Furrer et al (2003) evaluated the prevalence of HIV retinopathy. HIV retinopathy was present in 24% & opportunistic viral retinitis in 7% of HIV patients. In this study, the microangiopathy was associated with higher age & higher viral load of HIV rather than related to immunosuppression.

Goldberg et al (2005) studied the effectiveness of HAART on HIV associated retinopathies. They reported that CMV retinitis declined by 80% in the HAART era. The survival also increased from 6-10 months to 1 year. Immune recovery uveitis may occur in upto 63% of patients with regressed CMV retinitis on HAART.

Pradyot Biswas et al (2008) studied the ophthalmic manifestations in HIV patients in Eastern India. Ophthalmic manifestations were found in 29.14%. In that, 64.7% had posterior segment manifestations, 23.52% had neuro ophthalmic manifestations, 19.60% had anterior segment lesions 15.69 % had adnexal lesions. HIV retinopathy was the commonest involving 23 eyes. CMV retinitis was seen in only 10 eyes. Ophthalmic manifestations were less in this study than reported in earlier literature in India & abroad.

Venkatesh et al (2008) studied the ophthalmic manifestations of HIV in India in the HAART era in this study, 45% had ophthalmic manifestations, the most common being the CMV retinitis. HIV retinopathy was seen in 11%, IRU in 5% , ARN in 3%, choroiditis in 2%, NO lesions in 12%, complicated cataract in 6%, keratouveitis in 1% & corneal ulcer in 1%. 7% of patients presented

with ophthalmic manifestations as the only presenting sign of HIV infection. Among those who had ocular manifestations, 50% had CD4 count < 100cells /cu mm & 70% had CD4count < 200 cells cumm.

AIM OF THE STUDY

The aim of this study is to determine the frequency of various ocular manifestations in HIV infected patients.

Objectives :

- To correlate the various ocular manifestations with the CD4 count
- To study the frequency of various ocular manifestations in different age groups
- To study the sex distribution of various manifestations
- To analyse the frequency of occurrence of other systemic comorbid conditions.
- To compare and analyse the present study with inference to other studies in literature
- To emphasize the importance of early ophthalmic examination and frequent follow up on HIV infected patients.

MATERIALS AND METHODS

SITE OF THE STUDY:

The study was carried out in the Department of Ophthalmology, Government Rajaji Hospital, Madurai.

PERIOD OF THE STUDY :

The study was conducted from November 2008 to October 2009.

INCLUSION CRITERIA :

1. Patients diagnosed as HIV infected (confirmed by ELISA / TRIDOT test)
2. Patients of all age groups are included.

EXCLUSION CRITERIA :

1. Patients not willing to participate in the study
2. Seriously ill patients who cannot cooperate for ophthalmological examination.

ETHICAL COMMITTEE APPROVAL :

The study was submitted for approval of ethical committee meeting at Dean's chamber at Government Rajaji Hospital and approval was obtained.

SAMPLE SIZE:

100 patients from both sexes

DESIGN OF THE STUDY:

Cross sectional study (also known as Prevalence study)

SELECTION OF THE STUDY SUBJECTS :

Patients diagnosed as HIV infected attending ophthalmology out patient department GRH and those referred from ART centre and other departments, fulfilling the inclusion criteria are included in the study.

PROCEDURE OF THE STUDY :

Following details were collected from each patient.

General symptoms ocular symptoms, past history of tuberculosis, treatment history (HAART, prophylaxis treatment). Risk factors like sexual promiscuity, sexually transmitted diseases, blood transfusion and IV drug abuse are recorded using a master chart for each patient.

Examination to rule out any systemic illness which includes examination of

- Skin and mucosa
- Central nervous system

- Respiratory system
- Cardiovascular system
- Respiratory system
- Gastrointestinal tract

Detailed ophthalmic evaluation :

- Preliminary oblique examination done
- Visual acuity checked with Snellen's chart
- Anterior segment was examined using slit lamp biomicroscopy.
- Dilated fundus examination was done with Direct and indirect ophthalmoscopy.
- Findings were noted. Appropriate photographs were also taken.

OBSERVATION AND RESULTS

Total number of patients - 100

	No.	%
No. of patients with ocular manifestations	54	54%
No. of patients with anterior segment manifestation	7	12.9 %
No. of patients with posterior segment manifestations	17	31.5%
No. of patients with neuroophthalmic manifestations	4	7.4%
No. of patients with adnexal manifestations	43	79.62%

Table 1

AGE DISTRIBUTION

Age in years	No.of cases	%	Ocular manifes tations	AS manifes tations	PS manifes tations	Adnexal Manifes tations
0 - 10	3	3	0	0	0	0
11-20	3	3	0	0	0	0
21-30	32	32	20 (62.5%)	1 (3.1%)	6 (18.75%)	18 (56.25%)
31-40	41	41	22 (53.65%)	5 (12.2%)	6 (14.63%)	16 (39%)
41-50	18	18	11 (61%)	1 (5.5%)	5 (27.7%)	8 (44.4%)
51-60	3	3	33 (1%)	0	0	1 (33.3%)
>60	0	0	0	0	0	0

Majority of the patients in this study were in the age group of 31-40 (40%) and 21-30 (35.5%) corresponding to sexually active high risk group. Nearly 50% of the patients in this group showed ocular manifestations.

Table 2

SEX DISTRIBUTION

Sex	No.of cases	%	Ocular manifestations	AS mani festations	PS manifestations	Adnexal mani festations
Male	60	60	32 (53.3%)	5 (8.3%)	9 (15%)	24 (40%)
Female	40	40	22 (55%)	2 (5%)	8 (20%)	19 (31.6%)
	100	100	54	7	17	43

Males are predominant in number in this study in the ratio of 1.5 : 1.

Table 3

ASSOCIATED SYSTEMIC INFECTIONS

Systemic infections	No.of cases	%	Ophthalmic manifestations
TB	24	24%	14
Herpes (Oral and genital)	7	7%	3
Oral candidiasis	10	10%	5
Cryptococcal meningitis	1	1%	1

Tuberculosis is the most common systemic disease associated with HIV infected patients.

Others include oral candidiasis and Herpes.

Table 4

CD4 COUNT & OCULAR MANIFESTATIONS

CD4 count	No.of patients / %	No.of pts with ocular manifestations	No.of pts with AS manifestations	No.of pts with PS manifestations
< 100	23(23%)	14 (60.87%)	1 (4.34%)	7 (30.4%)
100 - 200	30(30%)	16 (53.3%)	1 (3.3%)	4(13.33%)
200 – 300	19(19%)	11(57.9%)	0	2(10.52%)
300 – 400	13(13%)	6(46%)	2(15.4%)	1(7.7%)
≥ 400	15(15%)	7(46.67%)	3(20%)	3(20%)
Total	100	54	7	17

Majority of the patients with ocular manifestations had CD4 count < 100 cells / cumm.

Table 5

ANTERIOR SEGMENT

AS Manifestations	No of cases
Iritis	5
Dry Eye	2
Keratitis	0

IRITIS

1 case associated with CMV retinitis

1 case associated with TB Panuvetis

1 case associated with toxoplasma

2 cases – old with festooned pupil

Table 6

ADNEXAL MANIFESTATIONS

Adnexal Manifestations	No.of patients	%
Conj microvasculopathy	36	83
Allergic conjunctivitis	2	4.6
OSSN	1	2.3
HZO	1	2.3
Mollussum of lid	1	2.3
Blepharitis	1	2.3
Lacrimal fistula	1	2.3
ACCO	1	2.3

Adnexal manifestations were seen in 43 (43%) of HIV infected patients.

CONJUNCTIVAL MICROVASCULOPATHY

Seen in 36 patients, accounting for 83% of adnexal manifestations.

19.4% of patients with conjunctival microvasculopathy have been associated with retinal microvasculopathy.

Table - 7

CD4 COUNT & CONJUCTIVAL MICROVASCULOPATHY

CD4	Conjunctival micro vasculopathy	%	HIV microangiography seen in pts with conjunctival microvasculopathy
<100	9	39.13	4
100-200	15	50	2
200-300	8	42.10	0
300-400	2	15.38	0
>400	2	13.33	1
Total	36	36	7

Table 8

POSTERIOR SEGMENT MANIFESTATIONS

Seen in 17(17%) patients

POSTERIOR SECALENT MANIFKCTATIONS	No of patients	%
HIV microangiography	10	58
CMV retinitis	4	23.5
Toxoplasma retinitis	1	5.9
TB Panuveitis	1	5.9
Old choroiditis scar	1	5.9

HIV microangiopathy was the most common lesion followed by CMV retinitis in this study.

Table 9

HIV MICROANGIOPATHY

Comprises 58% of patients having PS manifestations and is the most common PS manifestation.

CD 4 count and HIV microangiopathy

CD4	HIV micro angiography	%	Bilateral
<100	5	21.7	3
100-200	2	6.7	0
200-300	1	5.26	0
300-400	0	0	0
>400	2	13.33	1
Total	10		4

With the decrease in the CD4 count, the incidence of HIV microangiopathy increases.

Table 10

AGE DISTRIBUTION OF HIV MICROANGIOPATHY

Age	HIV micro angiography	%	Bilateral
0-10	0	0	0
11-20	0	0	0
21-30	2	6.25	1
31-40	4	9.75	0
41-50	4	22.2	3
51-60	0	0	0
>60	0	0	0

As the age increases, the incidence of HIV microangiopathy has also been increased in this study.

CMV RETINITIS

Seen in 4 (23.5%), patients with posterior segment manifestations.

Table 11

CD4 Count and CMV retinitis

CD4	CMV retinitis	%	Bilateral	ART taking
< 100	1	4.3	1	Yes
100-200	2	6.7	1	Yes
200-300	1	5.3	0	Yes
300-400	0	0	0	0
> 400	0	0	0	0

All the patients were on ART and 3 patients had CD4 count > 100 cells / cumm.

NEURO OPHTHALMIC MANIFESTATIONS

Seen in 4 patients. Majority were sequelae of CNS lesions.

Table 12

CD4 Count & Neuro ophthalmic manifestations

CD4 count	No.of patients / %	No.of patients with ocular manifestations	No.of patients with neuro ophthalmic manifestations
< 100	23(23%)	14 (60.87%)	2 (8.7%)
100 - 200	30(30%)	16 (53.3%)	0
200 – 300	19(19%)	11(57.9%)	0
300 – 400	13(13%)	6(46%)	1 (7.7%)
≥ 400	15(15%)	7(46.67%)	1 (6.67%)
Total	100	54	4

Table 13

HAART & OCULAR MANIFESTATIONS

	No of Patients	No of patients with ocular manifestations	AS manifes tations	PS manifes tations	Neuro ophthal manifestations
On HAART	18 (19%)	13 (72%)	12 (66.67%)	5 (27.78%)	3 (16.675)
Not on HAART	82 (82%)	41 (50%)	36 (43.9%)	12 (14.63%)	1 (1.22%)

Patients on HAART had more ocular manifestations than those patients not on HAART. HAART taking patients would be in the late stage of the disease with low CD4 count and so they are more prone for infections.

DISCUSSION

The incidence of ocular manifestations in HIV infection has been reported on various studies to occur upto 100% (Ryan). J Biswas et al reported an incidence of 40-70%. In this study, Ocular manifestations are seen in 49% of patients.

Adrenal manifestations are most commonly seen in 79.6% of patients with ocular manifestations followed by posterior segment manifestation seen in 31.5% of patients. Anterior segment manifestations are seen in 13% and neuro ophthalmic manifestations in 7.4%.

Pradyot Narayan Biswas et al (2008) reported 29.14% of ophthalmic manifestations. Of them 64.7% had posterior segment lesion, 23.52% had neuroophthalmic manifestations, 19.6% had anterior segment lesion 15.69% had adnexal lesion.

Venkatesh et al (2008), reported ocular manifestations in 45% of patients, CMV retinitis being the most common.

The ocular manifestations in HIV infected patients are less common in this study than reported in earlier literature in India and abroad. This is supported by the studies of J Biswas et al (2000) & Pradyot et al (2008). This may be attributed to the lack of awareness

among patients, lack of adequate knowledge among health professionals and lack of facilities to look for ophthalmic manifestations in HIV infected individuals in India.

Majority of patients in this study are in the age group of 20 – 40 (73%), which is comparable to the WHO estimates (62.39%). This is attributed to the fact that this being the sexually active age group, the risk of exposure is very high. The increased awareness of the disease and early reporting in this age group can also be a contributing factor.

The gender incidence in this study is 1.5 : 1 (male : female). This male predominance is explained by their high risk of exposure due to their nature of work and economic freedom. According to WHO estimates among the adult living with AIDS/HIV 59% are males and 41% are females. In this study, it is 60% and 40% respectively which correlates well with the WHO reported incidence.

In this study, the most common systemic disease associated with HIV / AIDS patients is tuberculosis seen in 24% of patients oral candidiasis was seen in 10% and Herpes in 7% of patients. Cryptococcal meningitis, AIDS dementia complex, anemia are also

seen. Among tuberculosis patients, ocular manifestations are seen in 58.3%.

CD4 T cell count is an important predictor of immune suppression in HIV / AIDS patients. In this study, 11% of patients had CD4 < 50 cells / mm3, 23% had CD4 count < 100 cells/mm3 and 53% had CD4 count < 200 cells / mm3.

In this study, 72% of patients show ocular manifestations in HIV patients with CD4 count < 50 cells / mm3. In patients with CD4 count < 100 cells per cumm, 60.87% had ocular manifestations & between 100-200, 53.3% had ocular manifestations. Ocular manifestations decrease in prevalence with increase in CD4 count.

The observation concludes that the CD4 count is inversely related to the ocular manifestations in HIV patients with the decrease in CD4 count, the immunity decreases and the increase in occurrence of opportunistic infections, malignancies and other manifestations in HIV patients.

In terms of ocular symptoms, majority of patients are asymptomatic and only 12 patients (12%) are symptomatic. Defective vision being the predominant symptom, patients with CMV retinitis and toxoplasmosis are symptomatic with complaints

of defective vision and flashes/floaters. HIV microangiography and confunctional microvasculopathy patients are asymptomatic.

Anterior segment manifestations are seen in 12.96% of patients with ocular manifestations. Out of 7, 5 (71.4%) had iritis and 2 (28.5%) had Dry eye.

Among 5 Iritis affected patients, 3 had posterior segment inflammation. One patient had CMV retinitis, one patient had Toxoplasmo retinitis and one patient had pan uveitis 2 patients had old iritis with festooned pupil. Thus implies that most of the iritis in HIV patients are associated with or "spill over" from posterior segment inflammation. Most of these patients were treated with HAART.

J. Biswas et al (2008) reported that iritis is rarely associated with HIV diseases. Majority of cases are associated with retinal or choroidal infection such as CMV, tomoplasma, TB, syphilis etc.

No cases of keratitis are reported in this study.

Posterior segment manifestations are reported in 31.48% of patients with ocular manifestations. It is the 2nd most common manifestation next to adnexal manifestations in this study seen in 17% of HIV patients.

41.17% patients with posterior segment manifestations had CD4 count < 100 cells / mm3. With decrease in CD4 count, the incidence of posterior segment manifestations has increased.

HIV microangiography is the most common retinal manifestation in this study affecting 10% of patients and 58% among patients with ocular manifestations. Cotton wool spots are the most common manifestation followed by hemorrhage.

Kuppermann BD et al (1993) reported HIV retinopathy in 35% of patients. In patients with CD4 count < 50 cells / mm3, 45% had HIV retinopathy where as in patients with CD4 count > 50 cells / mm3 only 16% had HIV retinopathy.

DA Jabs et al (1995) reported HIV retinopathy in 50% of HIV patients.

But studies in India showed, low prevalence of HIV microangiography which correlates well with this study.

J. Biswas et al (2000) reported HIV retinopathy in 15% of HIV patients.

Venkatesh et al (2008) reported the prevalence of HIV retinopathy as 11% among patients infected with HIV.

In this study, in patients with CD4 count < 100, 21.7% had HIV microangiography whereas only 6.7% had HIV micro angiography in patients with CD4 count 100-200. This support the literature that when CD4 count decreases the prevalence of HIV retinopathy increases.

The prevalence of HIV retinopathy has increased with increase in age in this study. 6.25% affected in the age group between 20-30, 9.75% in 31-40 age group and 22.2% in 41-50 age group.

Furrer et al (2003) reported that HIV microangiography is associated with higher age group and higher viral load of HIV.

J Biswas et al (2008) related that the occurrence of HIV micro angiography correlates well with the conjunctional microvasculopathy. In the present study, 7 (70%) patients out of 10 patients with retinal microangiography had conjunctival microvasculopathy.

Clinical diagnosis of CMV retinitis is made in 4 patients (4%) in the total study group and in 23.5% of patients with posterior segment manifestations. Majority of them complained of defective vision and floaters. Two of the patients had secondary optic atrophy following CMV retinitis.

Various literature gives incidence of CMV retinitis as high as 15-40%. But in this study group, CMV retinitis is reported in only 4% of total study group and 23.5% of those with posterior segment manifestations. The higher incidence in literature may be because the studies elsewhere conducted dealt with full blown cases of AIDS, while this study is a mixture of asymptomatic cases with fewer cases of AIDS.

All the 4 patients with CMV retinitis were on HAART. Only one patient had CD4 count < 100 cells / cu.mm. Other 3 had CD4 count > 100 cells / cu.mm.

Various literature states that with the introduction of HAART, the incidence of CMV retinitis has come down approximately by 75%. But in this study, CMV retinitis is seen in patients treated with HAART. This is explained by Brian et al that CMV retinitis may occur with CD4 count > 100 cells / cu mm, because there may be incomplete restoration of the immune repertoire against CMV with HAART therapy.

Toxoplasma retino choroiditis is seen in 1 patient. It is a reactivation of old healed macular scar. The patient had symptoms of defective vision and floaters. The CD4 count was 836 cells/cumm.

“Spill over” anterior uveitis was also seen. Serological tests were not done due to lack of facility.

The panuveitis is seen in 1 patient secondary to TB. The patient is treated with ATT and steroids. ARN, PORN are not reported in this study.

Ocular adnexal manifestation is seen in 43% of HIV infected patients, conjunctival microvasculopathy being the commonest manifestation.

Conjunctional microvasculopathy is seen in 36% of patients in the study and in 83% of patients with adnexal manifestation. Literature evidence shows that 70-80% of HIV patients show conjunctival microvasculopahty and it correlates with the retinal microangiopathy. 19.4% of patients with conjunctival microvasculopathy are associated with retinal microangiopathy.

Ocular surface squamous neoplasia is seen in 1 patient with CD4 count 50 cells / cu mm. Nodular vascularised mass is seen in temporal limbus. Excision biopsy was done. HPE report confirmed low grade verrucous type of squamous cell carcinoma.

HZO is seen in 1 patient. The CD4 count is 345 cells. J. Biswas et al reported 1 case in 100 cases of HIV patients in 1999 & 7 cases per 100 HIV patients in 2008. HZO has been reported to occur in all stages of HIV.

Other manifestations include ACCO, Allergic conjunctivitis, molluscum of the lid, Blepharitis and lacrimal fistula. keratitis is not reported in this study.

Neuro ophthalmic manifestations are seen in 4% of patients in study group and 7.4% of patients with ocular manifestations. 1 patient had papilloedema with headache, vomiting, probably due to increased intracranial hypertension. 1 patient had secondary optic atrophy with bilateral LR palsy secondary to crptococcal meningitis. AIDS dementia complex was associated with 1 patient with primary optic atrophy. LMN type facial N palsy was seen in 1 patient. Majority of neuro ophthalmatic manifestations are secondary to CNS lesions which is in accordance with literature evidence.

Orbital cellulitis is seen in 1 patient (1%) secondary to abscess in the lid.

Among 100 patients, 2 patients presented with ocular manifestations as their first presentation which led to HIV diagnosis.

From the present study, we can conclude that anterior segment manifestations occur as often as the posterior segment manifestations. Majority of ocular manifestations are seen in patient with CD4 count < 100 cells / cu mm. But vision threatening lesions are also seen in patients with CD4 count > 100 cells / cu mm.

SUMMARY

The present cross sectional study is an attempt to assess the frequency of ocular manifestations in HIV infected patients and its correlation with CD4 count.

The study included 100 patients with 60 males and 40 females infected with HIV / AIDS attending ophthalmology outpatient ward in Govt Rajaji Hospital or referred from ART centre and other departments.

- Ocular manifestations seen in 54 (54%).

  Among patients with ocular manifestations.

- No. of patients with posterior segment manifestation is 17 (31.48%)
- No.of patients with anterior segment manifestations is 7 (12.96%)
- No.of patients with adnexal manifestations is 43 (79.62%)
- No. of patients with neuro ophthalmic manifestations is 4 (7.4%)
- Majority belong to the age group of 20-40 years (73%)
- Most common systemic infection associated is tuberculosis.

- 60.8% of patients and CD4 count < 100 cells / cu mm have ocular manifestations. But vision threatening lesions like CMV retinitis and toxoplasma retinitis have been reported in patients with CD4 count > 100 cells / cu mm in this study.
- HIV microangiography is found to be the most common retinal manifestations (10%). It correlates well with the occurrence of conjunctival microvasculopathy.
- Comparing the prevalence of retinal manifestations on HIV / AIDS with the international literature evidence, the prevalence is low. But it correlates with Indian Literature (J.Biswas et al and Pradyot Biswas et al).

CONCLUSION

Ophthalmic manifestations of HIV disease are increasingly being recognized in the present era due to increased longevity of patients after HAART.

This emphasizes the necessity for early recognition of ocular lesions and early treatment to provide good quality of vision, thereby providing good quality of life to patients infected with HIV.

In this study, sight threatening lesions like CMV retinitis and toxoplasma retinitis were reported in patients with CD4 count > 100 cells / cu mm.

Regular Ophthalmic examination must be done preferably once in 6 months in patients with CD4 count > 100 cells/ cumm and once in 3 months in patients with CD4 count < 50 cells cu mm, since the sight threatening lesions can occur at any stage of HIV infection. Screening for retinal disease can be done at home by patients themselves using Amsler's grid test once weekly by which they can detect scotomas in the central field. This would favour an early diagnosis and treatment, hence better visual prognosis.

HIV patients should be educated about the ocular manifestations and should be advised to undergo regular ophthalmic examinations.

Health care professionals should be trained and educated to pick up early cases of ophthalmic manifestations of HIV/AIDS thereby preventing vision threatening complications.

Timely referral for complete ophthalmic examination and early institution of therapy should be done to help the cause of people living with HIV / AIDS.

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PROFORMA - HIV RETINOPATHY

IDENTITY NO : AGE:
SEX:
EDUCATION : OCCUPATION :
MARITAL STATUS : ROUTE OF TRANSMISSION:
HIV TIME OF DIAGNOSIS:
ART DRUGS: DATE OF STARTING:
DURATUON:
IF YES, MISSED DOSES/DEFAULT:
HOW MANY TIMES:
NO OF DAYS:

OPPORTUNISTIC INFECTIONS:
VDRL : TB: HERPES SIMPLEX:
HERPES ZOSTER: CMV: PCP:
TOXOPLASMA :
OTHERS :
PREVIOUS VISIT:
DATE :
RETINAL FINDINGS:

	INITIAL VISIT	STUDY VISIT
CD4 COUNT		
WHO CLINICAL STAGING		

STUDY VISIT :
DATE:
VISUAL COMPLAINTS:

VN:
AS:

PS:

CD4:
CD4%:
CD3:
CD3%:
ALC:
LIDS
CONJ
CORNEA
AC
IRIS
PUPIL
LENS

KEY TO MASTER CHART

SEX:

Male – 1, female – 2

ART TAKING:

Yes – 1, no – 2

AS MANIFESTATIONS:

NAD – 1

Conjunctival microvasculopathy – 2

HZO – 3

Dry eye – 4

OSSN – 5

ACCO – 6

Vernal conjunctivitis – 8

Blepharitis – 9

Orbital cellulites – 10

Iritis – 11

Lacrimal fistula – 12

Molluscum – 13

PS MANIFESTATIONS:

NAD – 1

HIV microangiopathy – 2

CMV retinitis – 3

Toxoplasma retinitis – 4

Old choroiditis scar – 5

Panuveitis – 6

NEURO OPHTHALMIC MANIFESTATIONS:

NAD – 1

Optic atrophy – 2

6^{th} cranial nerne palsy – 3

7^{th} cranial nerve palsy – 4

Papilloedema – 5

TB :

Yes – 1

No - 2

ABBREVIATIONS

AIDS	–	Acquired immuno deficiency syndrome
ARN	-	Acute retinal necrosis
ART	-	Anti retroviral therapy
CME	-	Cystoid macular edema
CMV	-	Cytomegalo virus
CWS	-	Cotton wool spots
ELISA	-	Enzyme linked immmunosorbent assay
HAART	-	Highly activated antiretroviral therapy
HHV	-	Human herpes virus
HIV	-	Human immunodeficiency virus
HSV	-	Herpes simplex virus
HPV	-	Human papilloma virus
HZV	-	Herpes zoster virus
MAC	-	Mycobacterium avium complex
OSSN	-	Ocular surface squamous neoplasia
PORN	-	Progressive outer retinal necrosis
RD	-	Retinal detachment
TB	-	Tuberculosis

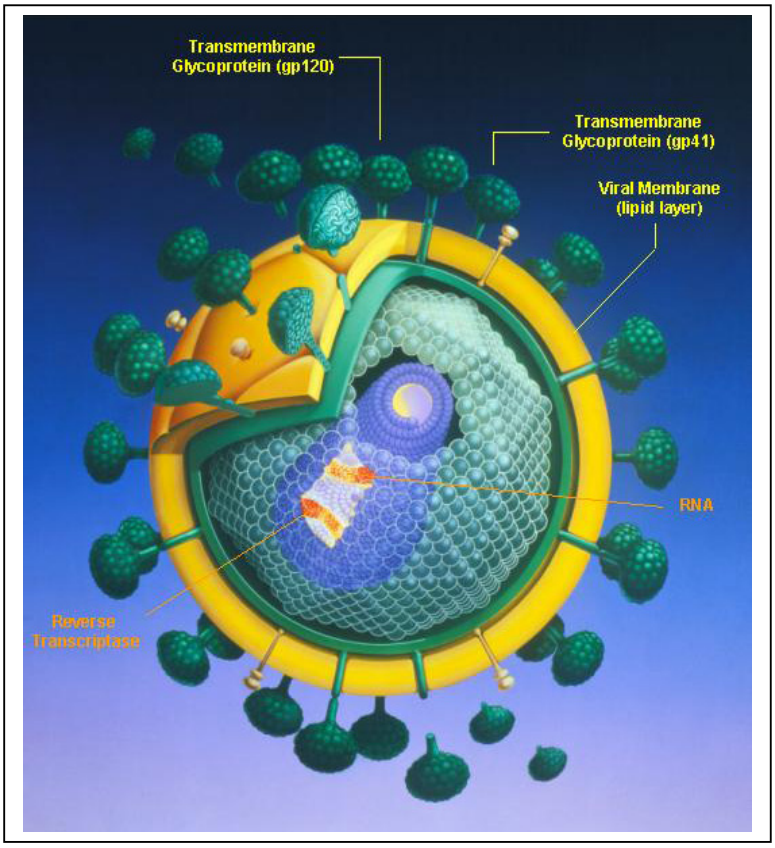
CONSENT FORM

I was informed & explained of the purpose & nature of the study. I am willing to participate in this study. I hereby give my full consent for the study.

Signature of the patient

Name of the patient

HIV VIRUS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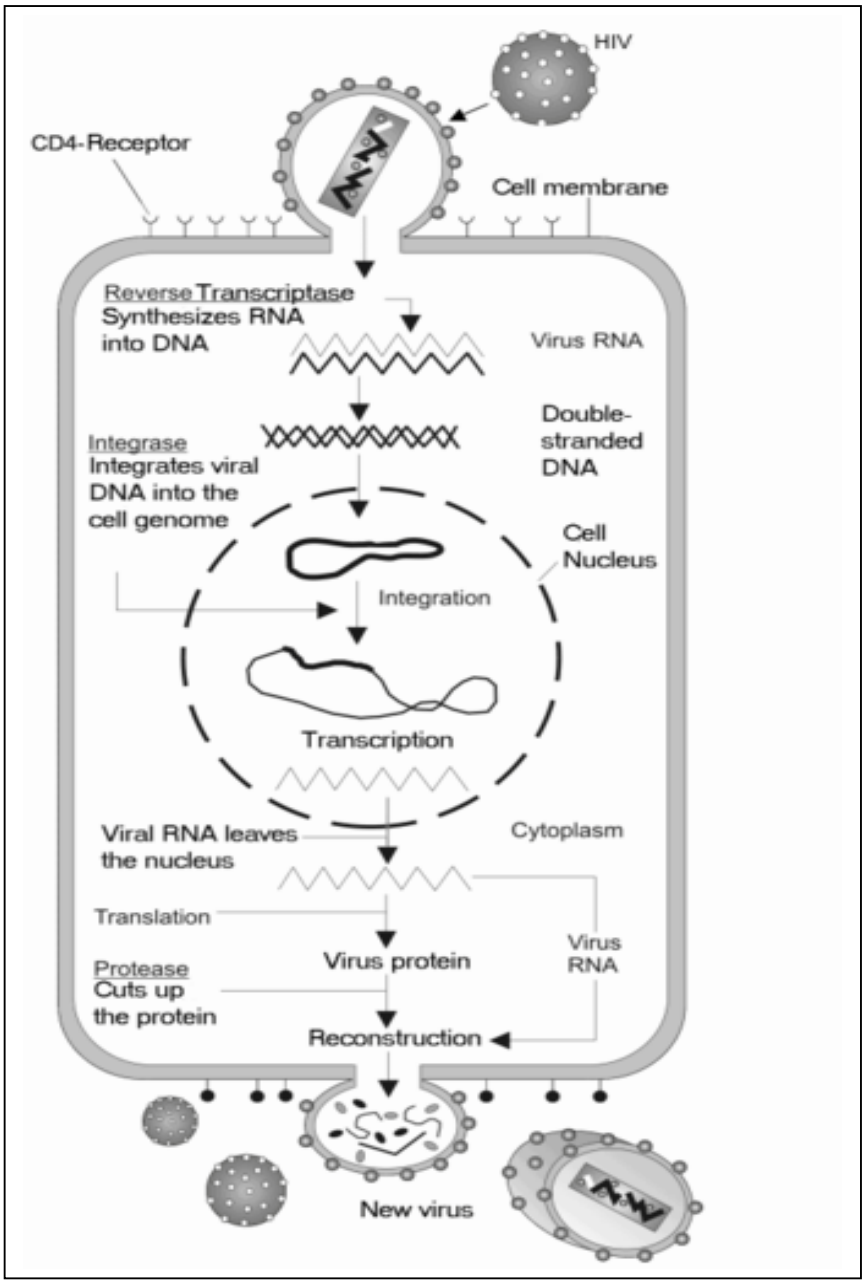
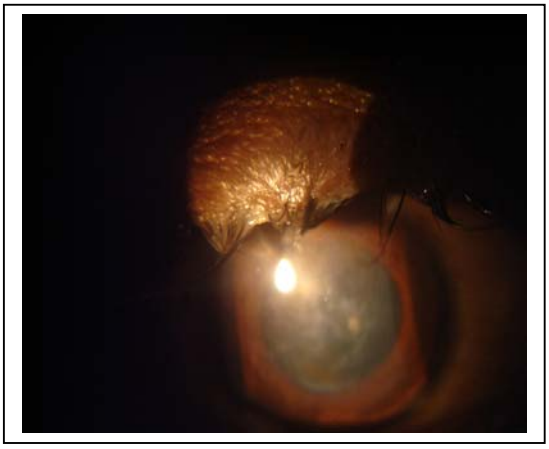
Transmembrane
Glycoprotein (gp41)
Viral Membrane
(lipid layer)
RNA
Reverse
Transcriptase

VIRAL REPLICATION



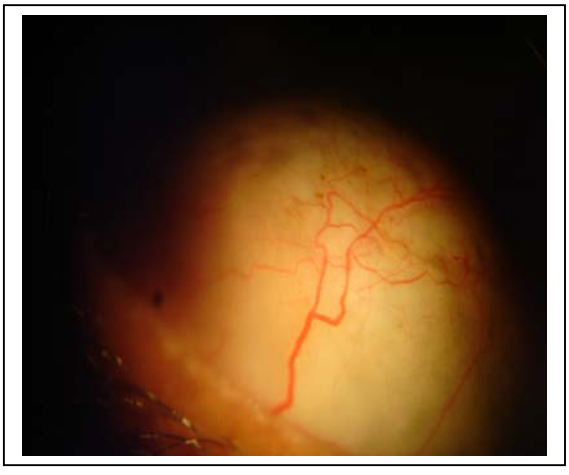
HERPES ZOSTER OPHTHALMICUS

BLEPHARITIS



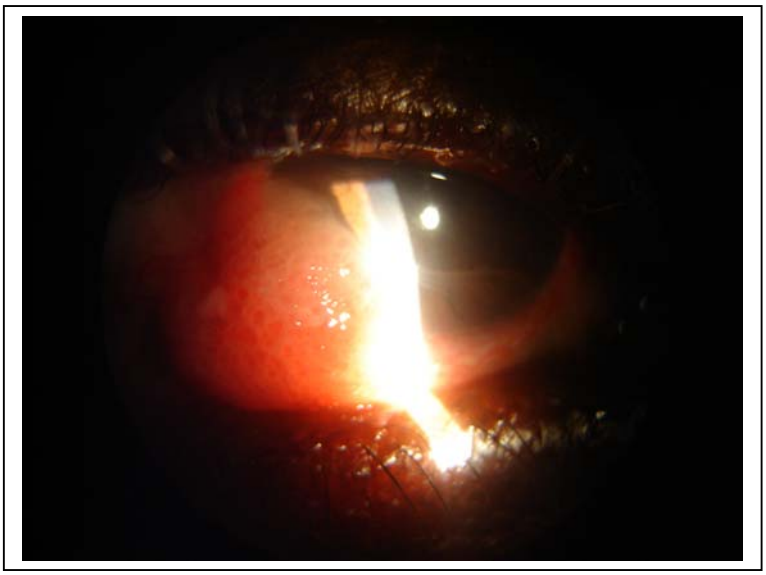
MOLLUSCUM OF THE LID

CONJUNCTIVAL MICROVASCULOPATHY

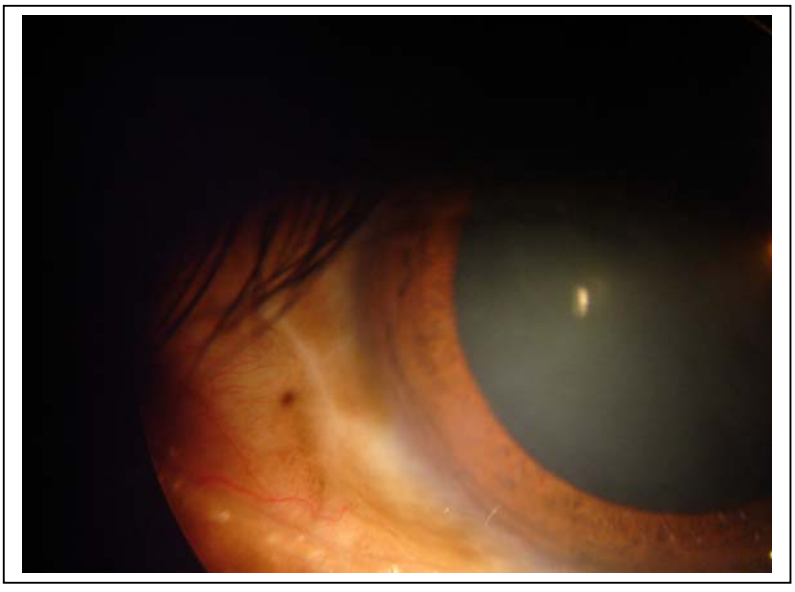


CONJUNCTIVAL OSSN

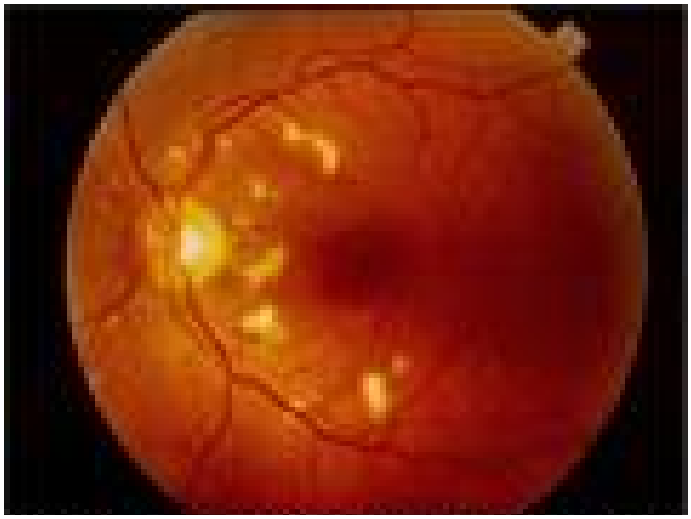
PRE OPERATIVE



POST OPERATIVE

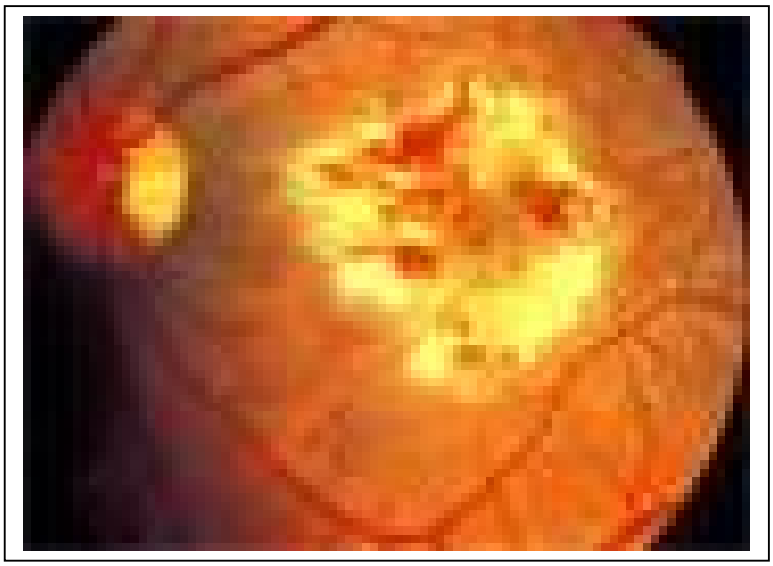


HIV MICRO ANGIOPATHY

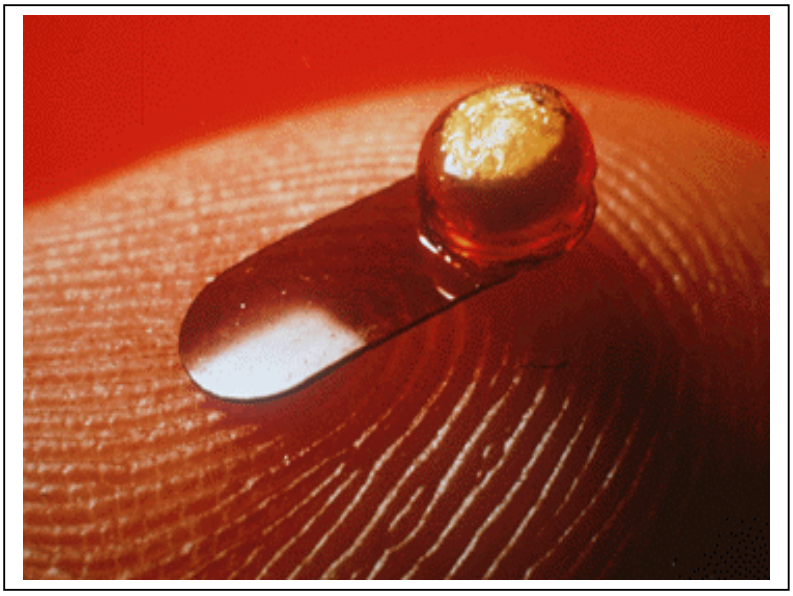


TOXOPLASMA RETINO CHOROIDITIS

CMV RETINITIS



GIOD



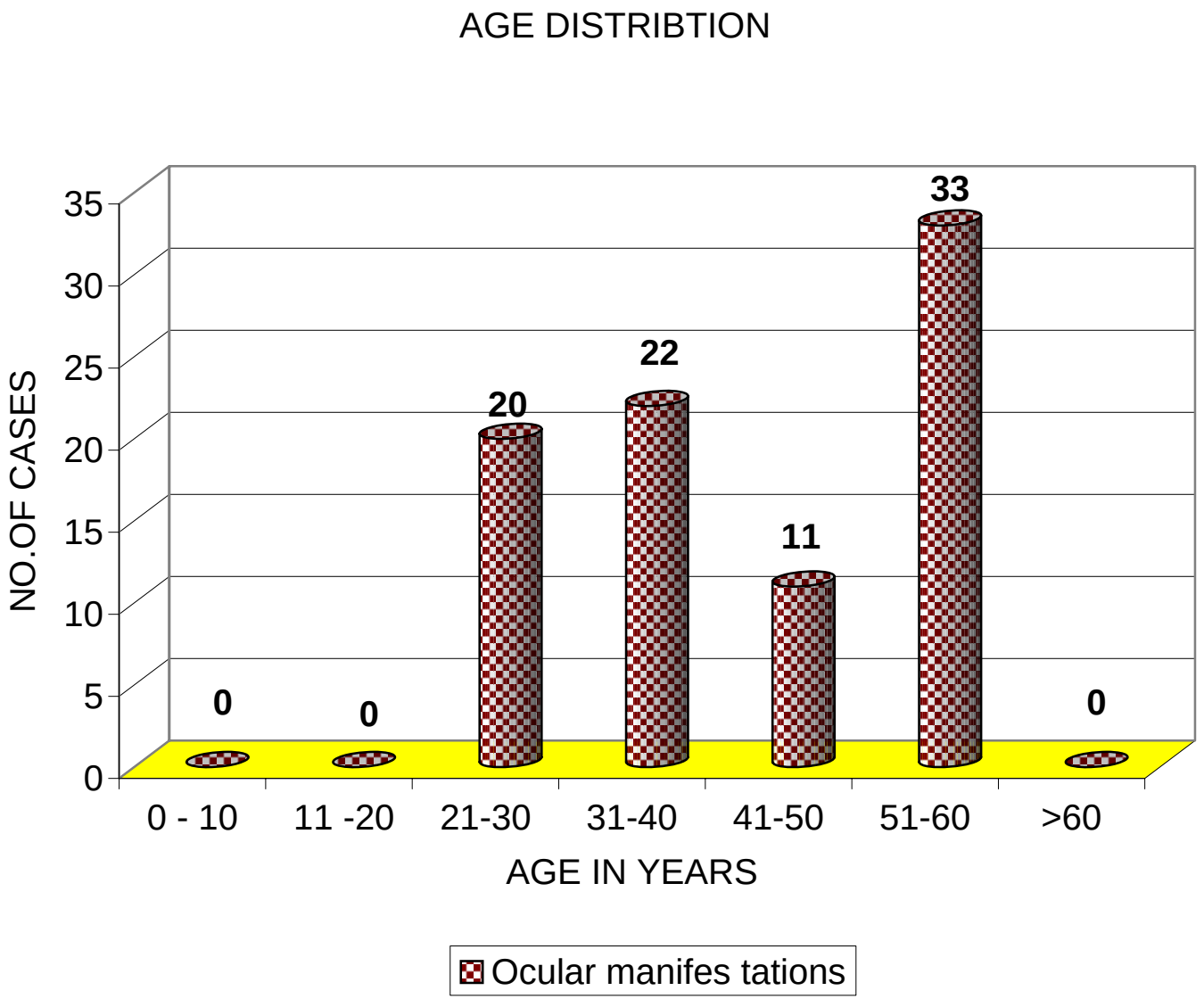
ORBITAL CELLULITIS

FACIAL NERVE PALSY

S.No.	op no	age	sex	CD4	CD3	ALC	ART	RE AS	LE AS	RE PS	LE PS	NO	TB	ASS CONDITIONS
1	415645	27	1	75			2	2	2	1	1	1	1	
2	415624	39	1	131	976	1243	2	1	1	1	1	1	2	
3	415734	39	1	45			1	5	1	1	1	1	2	
4	415827	35	2	136	1124	1584	2	1	1	1	1	1	2	
5	415398	26	1	161	1932	2312	2	2	2	1	1	1	1	
6	415625	32	1	375	2127	2335	2	1	1	1	1	1	2	
7	415892	6	2	455	2824	3815	2	1	1	1	1	1	2	
8	415439	21	2	593	3063	3576	2	1	1	1	1	1	2	genital warts
9	415289	25	2	58	1192	1398	2	1	1	1	1	1	2	
10	415425	36	2	169	2310	2806	2	2	2	1	1	1	2	
11	426749	35	2	155			2	2	2	1	1	1	2	
12	416153	29	1	111	1423	1587	2	2	2	1	1	1	1	
13	415804	36	1	187			2	1	1	1	1	1	1	
14	416337	37	1	190	1380	1966	2	1	1	1	1	1	2	
15	416451	39	1	5	183		1	1,4	1,4	1	1	2,3	1	cryptoccal meningitis
16	415382	42	1	816	2157	2605	2	1	11	1	4	1	2	
17	527918	42	1	49			1	2	2	2	2	1	2	
18	103833	35	2	419			2	1	1	1	1	1	2	
19	416753	60	2	210	3723	3953	2	1	1	1	1	1	2	
20	417221	35	1	245			2	1	1	1	1	1	2	
21	417216	41	1	165			2	1	1	1	1	1	2	
22	418142	21	2	316			2	11	11	6	6	1	2	
23	419626	35	1	156			2	2	2	2	1	1	2	
24	420402	35	1	312	1267	1924	2	2	2	1	1	1	1	
25	419925	47	1	1303	3120	4333	2	1	1	2	2	1	2	
26	424752	40	1	827	3308	3959	2	2	2,11	1	1	1	2	
27	413289	32	1	75	1192	1525	2	1	1	5	1	1	2	oral candida
28	429864	40	1	52	543	715	2	1	1	1	2	1	2	
29	428753	24	2	28			1	2	2	1	1	4	2	
30	430130	38	1	345			2	10	1	1	1	1	2	
31	413526	26	2	260	1269		1	8	8	3	5	1	2	
32	413529	34	1	116	598		1	2	2,11	1	3	1	1	
33	412356	25	2	442	6434	7061	2	2	2	2	1	1	1	
34	432167	31	2	376	2306	2814	2	1	1	1	1	1	2	
35	431735	24	1	171	2960	3211	1	1	1	1	1	1	2	

36	667/09	24	2	272	1717	2233	2	2	2	1	1	1	2	vulvovaginal candidiasis
37	563/08	45	1	354			2	1	1	1	1	2	1	AIDS dementia complex
38	464/09	38	1	97	1526	1795	1	1	1	1	1	1	1	oral candida
39	431837	37	1	314			2	1	1	1	1	1	2	
40	639/09	27	2	195	623	850	2	8	8	1	1	1	2	
41	706/09	23	2	1227	2596	3251	2	1	1	1	1	1	2	
42	396/09	30	2	168	1398	1859	1	2	2	3	3	1	1	
43	1760/08	34	2	249	1698	1895	2	2	2	1	1	1	1	
44	01/07art	52	1	86	1019	1165	2	1	1	1	1	1	1	
45	3374	37	1	145			2	2	2	1	2	1	2	
46	2248/08	10	2	781	2718	3305	2	1	1	1	1	1	2	
47	2247/08	7	1	696	2764	3656	2	1	1	1	1	1	2	
48	029/09	31	2	37	1209		1	9,12	9,12	1	1	1	2	
49	1742/07	29	1	165	2232	2558	2	1	1	1	1	1	1	
50	762/09	42	1	116	822	1020	2	1	1	1	1	1	2	
51	766/09	42	1	30	691	751	2	1	1	1	1	1	2	
52	760/09	36	1	124	1535	1807	1	1	1	1	1	1	2	
53	4059	35	1	129			2	1	1	1	1	1	2	
54	758/09	47	1	44	855	1246	2	2	2	2	1	1	2	oral candida
55	753/09	37	2	141	1097	1376	2	2	2	1	1	1	2	
56	752/09	16	2	167	1288	1559	2	1	1	1	1	1	1	
57	770/09	50	2	359	1747	2374	2	1	1	1	1	1	2	
58	779/09	45	1	234			2	2	2	1	1	1	2	
59	774/09	37	1	191	1394	1613	2	2	2	1	1	1	2	
60	752/09	47	2	205			2	2	2	1	1	1	2	
61	720/09	37	1	31	741	1353	2	1	1	1	1	1	1	herpes zoster
62	145/08	27	2	52			1	2	2	3	3	1	1	esophagial candidiasis
63	1850/06	40	2	219	1291	1568	1	2	2	1	1	1	2	chicken pox
64	790/09	33	1	275	1112	1559	2	1	1	1	1	1	1	
65	820/06	38	1	96	91	1092	2	1	1	1	1	1	1	
66	148/08	45	2	159	997	1284	2	1	1	1	1	1	2	
67	206/07	30	1	836	2568	33	1	1	1	1	1	5	2	
68	483/06	35	2	549	1636	2123	1	1	1	1	1	1	2	oral candida
69	837/05	45	2	70	1022	1392	2	2	2	2	2	1	2	herpes zoster
70	829/08	40	2	288			2	1	1	2	1	1	1	enital molluscum, oral candi
71	725/09	37	1	377	1398	2335	2	1	1	1	1	1	2	

72	2203/08	30	2	136	1124	1584	2	2	2	1	1	1	2	
73	701/05	35	2	1551	3915	5272	1	11	11	1	1	1	1	
74	729/09	25	1	29	1253	1513	2	2	2	1	1	1	2	
75	621/09	43	1	166	1101	1268	2	2	2	1	1	1	2	
76	734/09	30	1	212	1190	1691	2	1	1	1	1	1	2	
77	2147/06	13	1	271	1001	1907	2	1	1	1	1	1	2	
78	707/09	26	2	20	275	373	2	1	1	1	1	1	2	
79	796/09	51	1	354			2	2	2	1	1	1	2	
80	755/09	44	1	59	839	1115	2	2	2	1	1	1	1	
81	1730/08	27	1	134	1220	1563	1	2	2	1	1	1	1	genital herpes
82	791/09	40	1	269	1639	1863	2	2	2	1	1	1	2	
83	783/09	30	1	70	1604	2004	2	1	1	1	1	1	2	
84	1153/07	24	1	433	980	1312	2	6	6	1	1	1	2	
85	49192	31	2	256			2	1	1	1	1	1	2	
86	826/09	43	1	299	2092	2865	2	2	2	1	1	1	2	
87	2069/07	23	2	240			2	1	3	1	1	1	2	
88	49773	23	2	142	14	189	2	1	1	1	1	1	2	pancytopenia
89	1306/07	35	1	322	1704	2497	2	4	4	1	1	1	2	genital herpes,oral candida
90	2345	24	1	604	2760	3486	2	1	1	1	1	1	2	
91	857/09	28	1	124	1043	1547	2	1	1	1	1	1	2	
92	767/09	28	1	205	943	120	1	1	1	1	1	1	2	
93	873/09	30	2	47	473	600	2	2	2	2	2	1	2	
94	2089/07	29	2	137	680	1157	2	2	2	1	1	1	2	
95	884/08	13	2	299	3471	4357	2	1	1	1	1	1	2	
96	885	42	2	62	565	762	2	1	1	1	1	1	1	herpes
97	652/09	40	1	303	1718	1917	2	1	1	1	1	1	2	
98	876/09	33	1	199	1369	1802	2	2	2	1	1	1	2	
99	878/09	43	1	303	1718	1917	2	1	1	1	1	1	2	
100	840	25	1	231			2	2,13	2	1	1	1	2	


AGE DISTRIBTION
NO.OF CASES
35
30
25
20
15
10
5
0
0
0
20
22
11
33
0
0 - 10
11 -20
21-30
31-40
41-50
51-60
>60
AGE IN YEARS
Ocular manifes tations